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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/578,026

03/13/2007

Jozef Thomas Martinus Van Beek

EPC-019

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EXAMINER

KUSUMAKAR, KAREN M

ART UNIT

PAPER NUMBER

2829

MAIL DATE

DELIVERY MODE

03/05/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/578,026	Applicant(s) VAN BEEK ET AL.	
	Examiner KAREN M. KUSUMAKAR	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 and 12-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-7 and 12-16 is/are allowed.
- 6) ☒ Claim(s) 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. As of the amendment filed 2/13/09, no claims have been added, claims 9-11 been canceled, and claims 1 and 8 have been amended. Therefore, claims 1-8 and 12-16 remain pending, with claims 1 and 8 being independent.

Drawings

2. The drawings were received on 2/13/09. These drawings are accepted.

Response to Amendment

3. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Response to Arguments

4. Applicant's arguments, see amendment filed 2/13/09, with respect to claim 8 has been fully considered and are persuasive. The rejection of claim 8 has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of ***Kubena et al. (US 6,580,138)*** and ***(Kim et al. (US 2001/0005631))***.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2829

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Kubena et al. (US 6,580,138)** in view of **(Kim et al. (US 2001/0005631))**.

Kubena teaches an electronic device comprising a micro-electromechanical systems (MEMS) element at a first side of a substrate (see Abstract and Fig. 12A), the MEMS element comprising a first (contact electrode 38-2) and a second electrode (element 22-2, Fig. 12A) that is movable towards and from the first electrode between a closed and an opened position (col. 2:30-33), and that is separated from the first electrode by an air gap in its opened position (Fig. 12A), wherein the device comprises an etch stop layer (silicon dioxide layer 34, Fig. 12A) between the first electrode and the substrate (col. 6:46-48), the etch stop layer comprising a substantially non-conducting, fluorine chemistry inert material that is inert against chemical dry etching using fluorine chemistry (silicon dioxide is resistant to fluorine) and the substrate being etchable with fluorine chemistry (the substrate is silicon, and silicon is etchable with fluorine).

Kubena does not teach the etch stop layer comprises HfO_2 , ZrO_2 , Al_2O_3 or TiO_2 . However, Kim does teach an etch stop layer (auxiliary etch stop layer 550, Fig. 1) that comprises Al_2O_3 (p.2, [0028]). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use an

Art Unit: 2829

etch stop layer comprising Al_2O_3 as taught by Kim so as to prevent the underlying insulating layer from being dissolved or damaged (Kim, p. 1, [0010]).

Allowable Subject Matter

7. Claims 1-7 and 12-16 are allowed. The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach all the limitations of claim 1. In particular, the prior art fails to teach a MEMS device with two electrodes, one movable towards the other, a substrate non-inert against fluorine chemistry, and using a fluorine-containing plasma for etching the sacrificial layer. In most cases (i.e. Gabriel et al.), if a fluorine chemistry etchant is used, the substrate is made of a fluorine chemistry inert material. Exceptionally, when a fluorine chemistry etchant is used, the remaining steps of claim 1 are not present.

For example, Kubena teaches A method of manufacturing a MEMS element comprising the steps of: providing an etch stop layer of electrically insulating material at a first side of a substrate, the substrate being non inert against etchable by dry etching using fluorine chemistry; providing a base layer of an electrically conductive material on the etch stop layer at the first side of the substrate, the first electrode being defined in the base layer; and providing the second electrode by defining same in the mechanical layer or as a separate layer in or on the sacrificial layer.

Kubena does not teach a sacrificial layer which at least covers the first electrode in the base layer, a mechanical layer of an electrically conductive material on top of the sacrificial layer, or a mask on top of the mechanical layer which provides a window to

Art Unit: 2829

the sacrificial layer. Combining references would not have been obvious as there would not be sufficient motivation to do so.

Claims 2-7 and 12-16 are allowed at least because they depend from claim 1.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Cho et al., Dennison et al., and Steinberg et al. teach the use of etch stop layers comprising at least one of HfO₂, ZrO₂, Al₂O₃ or TiO₂.

Art Unit: 2829

10. Any response to this Office Action should be faxed to (571) 273-8300 or mailed to:

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Hand-Delivered responses should be brought to:

Customer Service Window
Randolph Building
401 Dulany Street
Alexandria, VA 22313

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAREN M. KUSUMAKAR whose telephone number is (571) 270-3520. The examiner can normally be reached on Mon - Thurs 7:30a - 5:00p EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on 571-272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

Art Unit: 2829

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. M. K./
Examiner, Art Unit 2829
2/28/2009

/Ha T. Nguyen/
Supervisory Patent Examiner, Art Unit 2829